# A MONOGRAPH OF THE GENUS HEMIMERIS 

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## HISTORY

The genus Hemimeris was first described by Linnaeus ${ }^{1}$ in 1760. He neglected to explain the origin of the name, but according to Sir J. J. Smith ${ }^{2}$ it is derived from two Greek words, $\dot{\eta} \mu$ ', meaning "half"' and $\mu \varepsilon ́ p o s, ~ " a ~ p a r t ~ o r ~ f r a g m e n t, " ~ r e f e r-~$ ring to the flower which is cut away on one side, that is, lacking a spur. It has been claimed that it was because of this character that Linnaeus originally separated this group from $A n$ tirrhinum. The name might possibly refer as well to the stamens, inasmuch as Hemimeris has half the number found in most genera of the Scrophulariaceae.

The status of the name has become confused since it has not been possible to determine exactly what Linnaeus had in mind when he described Hemimeris bonae-spei, and also by the fact that Linnaeus fil., in dealing with Hemimeris, entirely ignored his father's description and formulated a new one based chiefly upon plants collected by Thunberg. The name Hemimeris bonae-spei, some authorities claim, was applied by Linnaeus to the plants now known as Diascia diffusa. Were this true, the name Diascia would have to be included in the list of Nomina Conservanda, or the plants known by that name for one hundred years or more would have to be changed to Hemimeris and those now known as Hemimeris would have to be given another name. Hiern believed that this change should be made, ${ }^{3}$ and in the original manuscript for the 'Flora Capensis' actually did interchange the two names. However, Thiselton-

[^0]Issued December 27, 1937.
Ann. Mo. Bot. Gard., Vol. 25, 1938.

Dyer, the editor, did not agree and published ${ }^{4}$ the account under the names in use at that time. The present writer does not accept the argument set forth by Hiern and agrees with Bentham ${ }^{5}$ that the name Hemimeris should be maintained for the group under discussion.

The history of the genus is somewhat complicated. Linnaeus described Hemimeris bonae-spei ${ }^{6}$ in 1760, as follows: "Veronica africana, floribus ad genicula pedicellis biuncialibus. Herm. Afr. 783, (Pluk. phyt. 320. f.5). Herba statura pedicularis. Caules pedales, prostrati, laeves. Folio inferne terna (superiora ad flores saepe alterna), petiolata, lanceolata, obtusa, pinnatifida. Flores axillares, alternii. Pedunculo longo, sed calyx 5-partitus." The illustration cited from Plukenet is Scoparia dulcis according to Britten. ${ }^{7}$

Linnaeus later transferred Hemimeris bonae-spei to Paederota as $P$. bonae-spei ${ }^{8}$ and repeated the original description, adding the phrase "fol. pinnatifidis" and placing the whole under "Diandra." Hiern stated that this last addition "made no difference in effect," ${ }^{\prime}$ but it is difficult to understand why he took this position in view of the fact that the most important difference between the two genera is that there are two stamens in Hemimeris and four in Diascia. It must be recalled also that the true Paederota has two stamens. The rest of the description is a repetition of the original and most of it could fit any one of the species now known as Hemimeris sabulosa, H. montana, Diascia diff usa, or D. Bergiana, with the exception of the color "purpurei lineis albentibus." This is the color of the flowers in Diascia diffusa and D. Bergiana. Hemimeris has yellow flowers. The phrase "folia inferne terna" does not apply to any species of Diascia now known, but in several specimens of Hemimeris sabulosa the lower leaves appear to be ternate and in some collections the lowermost are trilobed. The

[^1]use of the name Paederota bonae-spei was continued through many subsequent publications and always under "Diandra."

In the synonymy given in the 'Amoenitates Academicae,' Linnaeus refers to a plant in "Pet. mus. 245," [recte 345]. This is in the Herb. Sloane in the British Museum, vol. 156, $f$. 157, and is Hemimeris montana without question. This is also the plant referred to in Roy. Lugd. 416. 1740, as "Anagallis foliis sinuatis." Linnaeus, in his original paper, stated that the plants described were based upon material mostly in the Burmann collection. This was a miscellaneous collection of specimens of Cape plants gathered by Hermann, Oldenland, Auge, and others. In the Burmann herbarium at Geneva, there are seven sheets of plants belonging to Hemimeris, four of which are $H$. sabulosa and three $H$. montana. There are six sheets of Diascia, four being D. diffusa, the common species in the vicinity of the Cape, one D. macrophylla, and one which may be identified with some doubt as $D$. Bergiana. The collectors of these plants are unknown.

In the Linnaean Herbarium at London there are three sheets of Hemimeris montana, one of H. sabulosa, and two of Diascia diffusa. These were collected by Sparrman, Thunberg, or Fabricius, after Linnaeus had published his 'Plantae Africanae Rariores,' so may be disregarded as far as this problem is concerned. That confusion existed in the mind of Linnaeus at this time is evidenced by the labels on the three sheets of Hemimeris montana, two being labelled by him as "montana" and the third as "diffusa."

Linnaeus fil. described the genus Hemimeris ${ }^{10}$ without any reference whatever to a previous publication. He listed $H$. sabulosa, H. montana, and H. diffusa, citing Thunberg's collections and placing all of them under "Didynamia" in spite of the fact that his $H$. diffusa was the only one having four stamens. Both Lamarck ${ }^{11}$ and Richter ${ }^{12}$ claim that Linnaeus fil. considered $H$. diff usa to be a variety of $H$. sabulosa. Thunberg, ${ }^{13}$ Jussieu, ${ }^{14}$ and Willdenow ${ }^{15}$ also listed the species with

[^2][^3]either two or four stamens under Hemimeris, and in Richter's 'Codex,' we find Paederota bonae-spei used for the last time.

Sir J. J. Smith ${ }^{16}$ in Rees' 'Cyclopaedia' gave Paederota bonae-spei as a synonym of $H$. diffusa saying, "We can hardly doubt that the original Hemimeris (afterward called Paederota) bonae-spei is this species though it was at first described as diandrous." This opinion is discredited by the fact that there is in the Linnaean Herbarium a sheet of so-called Hemimeris diff'usa on which the "Hemimeris" is in Linnaeus' handwriting, the "diff usa" in that of his son, and on the back of the same sheet, again in Linnaeus' handwriting, is a description of the plant which Smith claims is the original description. For some reason, Smith failed to note that this plant was collected by Sparrmann some years after Hemimeris was first published and therefore it cannot be the original description.

Link and Otto ${ }^{17}$ described the genus Diascia in 1820, basing it upon material grown from seed sent by Bergius from the Cape. They named the species D. Bergiana and in no way did they refer to any previous publication nor suggest possible relationship between Diascia and any other genus. Sprengel ${ }^{18}$ recognized Diascia as a genus under the caption "Didynamia" and listed four species, three of which belong in Diascia, as now interpreted, and one in Hemimeris. Under the latter genus, he enumerated a number of species, all natives of South America, which are now attributed to Alonsoa.

Bentham, ${ }^{19}$ in his synopsis of the Hemimeridae, was the first to separate the two groups definitely, retaining the name Hemimeris for the plants having two stamens and Diascia for those with four. He did this, he said, because the name Diascia was more particularily applicable to the form of the corolla of that group. However, he followed Smith in believing that Linnaeus referred to a four-stamened flower in the original description. As a matter of fact, no reference was made to the number of stamens in the first publication. Bentham listed

[^4]three species under Hemimeris and seventeen under Diascia. Hiern, the most recent author to study these genera in detail, as mentioned before, believed that the generic names should be transposed. He based most of his argument upon plants in the Sloane collection, none of which were collected by Hermann, and upon certain plants in the Linnaean herbarium which, as shown above, were collected after Linnaeus had described the genus. Four species were listed under the generic name Hemimeris in the 'Flora Capensis.'

## GEOGRAPHICAL DISTRIBUTION

Hemimeris is a small genus confined to the western and southwestern parts of the Cape Province in South Africa. It grows commonly in soil of decomposed sandstone, in crevices where there is more or less moisture, and in cultivated areas of clay or sandy loam. Its center of distribution is in the Cape and in the adjacent districts of Stellenbosch, Paarl, and Malmsbury, where it sometimes becomes so abundant as to color a large area. The two common species, H. sabulosa and H. montana, occur chiefly in this region. Both continue northward into Namaqualand, H. montana occurring almost as far north as the Orange River, and eastward along the coast for some distance. H. centrodes is a somewhat localized northwestern species, having been collected only in the Bokkeveld and in the mountains of the Calvinia District. H. gracilis seems to be even more restricted, but that may be due to a paucity of collections from the areas in which it grows. It is represented by only a few sheets of specimens gathered in the Worcester District, in the Onder Bokkeveld, and near Van Rhynsdorp. In the Onder Bokkeveld, it occurs within the range of $H$. centrodes.

## PHYLOGENY

H. sabulosa appears to be the most primitive species of Hemimeris in having the least specialized corolla and more or less glabrous stems. The corolla is more nearly regular and the pouches are not at all well developed. One can readily conceive that $H$. montana has been derived from some such primi-
tive type through specialization toward a more conspicuously irregular corolla and larger pouches. The sacs of H. montana are prominent and the stamens frequently are hidden by the overarched posterior corolla lip. The size of the sacs varies considerably, and specimens in which they have attained almost the length of the lateral lobes have been designated as var. pachyceras. This variety is found mostly in the semi-arid parts of the western Cape Province, extending north into Namaqualand and east as far as Calvinia.

Through enlargement and elongation of the spurs, it is not difficult to hypothesize the remaining two species as having been derived from H. montana. H. centrodes and $H$. gracilis are localized species in which long spurs have been developed. H. centrodes superficially resembles Diascia, especially D. macrophylla, and has therefore been confused with members of that genus. H. gracilis differs from its congeners in having a conspicuously winged style and strongly divergent spurs. Certain other species have narrowly winged styles but in H. gracilis this tendency attains an extreme development.
In its affinities, Hemimeris unquestionably approaches Diascia closely. It differs from Diascia chiefly in the reduction of the number of stamens and in the method of the dehiscence of the capsule, this occurring in such a way that the base of the persistent style is split into four parts. In Diascia the base of the style is split into two parts, as a rule, but sometimes into four. The two genera are alike in the basal circumflexion of the anterior stamens, in having two sacs or spurs, and in the general shape of the capsule. In both genera the seeds are usually destitute of wings, but occasionally narrow wings are developed.

## ABBREVIATIONS

Abbreviations indicating the herbaria in which specimens cited in this paper are deposited are as follows:

A-Albany Museum at Grahamstown.
B-Herbarium of the Botanic Garden and Museum in Ber-lin-Dahlem.
BH-Bolus Herbarium at the University of Cape Town.

BM-Herbarium of the British Museum (Natural History), London.
F-Herbarium of the Field Museum of Natural History, Chicago.
FH-Herbarium of Mr. H. G. Fourcade.
G-Gray Herbarium of Harvard University, Cambridge.
Gen-Herbarium of the Botanic Garden, Geneva.
K-Herbarium of the Royal Botanic Gardens, Kew.
L-Linnaean Herbarium of the Linnaean Society, London.
M-Herbarium of the late Dr. Marloth, now a part of the National Herbarium in Pretoria.
MBG-Herbarium of the Missouri Botancial Garden, St. Louis.
P-Herbarium of the Academy of Natural Sciences of Philadelphia.
US-United States National Herbarium, Washington.
The author wishes to express her sincere appreciation to the curators of the herbaria enumerated above for their courtesy and aid during her study of Hemimeris, especially to Sir Arthur W. Hill and Mr. A. D. Cotton, of the Royal Botanic Gardens at Kew, and Dr. Louisa Bolus, of the Bolus Herbarium, University of Cape Town.

## TAXONOMY

Hemimeris L. Pl. Rar. Afr. 8. 1760, in part; L. f. Suppl. 45. 1781, in part; Murray, Syst. Veg. 561. 1784, in part; Thunb. Nov. Gen. Pl. 74. 1784, in part; Prodr. 105. 1800, in part; Fl. Cap. [ed. Schult.] 484. 1823, in part; Juss. Gen. Pl. 120. 1789, in part; ed. 2, 134. 1791, in part; Lam. Cycl. 3: 104. 1789, in part, and Suppl. 3: 45. 1813; L. Gen. Pl. ed. 8 [by Schreber] 2: 409. 1791, in part; Willd. Sp. Pl. 3: 282. 1800, in part; Gaertn. f. Fruct. et. Sem 3: 21, t. 183. 1807; J. J. Smith in Rees' Cycl. 17: 4H. 1819, in part; Spreng. Syst. Veg. 2: 809. 1825; Endl. Gen. Pl. 672. 1836-40, in part; Benth. in Hook. Comp. Bot. Mag. 2: 15. 1836; DC. Prodr. 10: 255. 1846; Harv. Gen. S. Afr. Pl. 255. 1838; Benth. \& Hook. Gen. Pl. 2: 931. 1876; Hiern in Th.-Dyer, Fl. Cap. 4²: 164. 1904; Thonner, Fl. Pl. Afr. 490.

1915; Bews, Fl. Natal. 182. 1921; Phillips, Gen. S. Afr. Pl. 544. 1926; Levyns, Fl. Cape Pen. 224. 1929; Marloth, Fl. S. Afr. $3^{1}$ : 129. 1932.

Paederota L. Sp. Pl. ed. 2, 20. 1762, in part; Amoen. Acad. ed. 1, 6: 83. 1763, in part; and ed. 2. 1764, in part; Houtt. Handl. ed. 2, 7: 107. 1777, in part; Richter, Codex, 29. 1840, in part.
Annuals, glabrous, glandular-pubescent or viscid-villous. Stems simple or more or less freely branched, quadrangular, often channelled or ridged; branches opposite. Leaves opposite, the uppermost sometimes alternate, petiolate, rarely sessile, simple, toothed, lobed, or pinnatifid, rarely almost entire, often with smaller leaves fascicled in the axils; cotyledonary leaves smaller, frequently persistent, petiolate, ovate, usually entire. Flowers axillary or terminal, solitary or more often in condensed racemes at the apex of the stem, these frequently with such short internodes as to appear umbellate; pedicels longer than the flowers, erect at anthesis, spreading or deflexed in fruit. Calyx campanulate, scarcely imbricate, 5 -lobed, the lobes free nearly to the base, unequal. Corolla bilabiate, generally villous externally, yellow; tube very short or obsolete; throat short; the upper lip emarginate, smaller, exterior in the bud, usually with a reflexed margin and a more or less welldeveloped pouch near the center; lower lip 3-lobed, the lateral lobes short and broad, commonly with a large number of compound subsessile glands toward the base and two pouches or spurs at the base of the lip, the basal part of which is covered with sessile glands, sometimes with two appendages at the sides of the throat, lowermost lobe concave, much longer and broader, usually emarginate. Stamens 2, erect, inserted on the sides of the narrow throat; filaments usually compressed and often narrowly winged, circumflexed at the base; anthers large, one-celled through confluence, usually connivent when mature ; pollen grains oval or rounded, smooth, pores numerous. Ovary 2-celled with axile placentation; style persistent, usually declined, longer or shorter than the ovary, frequently winged, the terminal portion stigmatose. Capsule ovate or subglobose, dehiscent both septicidally and loculicidally in
varying degrees, generally splitting the base of the style into four parts; placentae coherent, forming a central column. Seeds numerous, brown or black, oval, scarcely 1 mm . long, papillate, occasionally very narrowly winged. Embryo straight; cotyledons entire.

The position of the stamens and style in relation to one another and the well-developed nectaries at the base of the spurs or sacs would indicate that the flowers are insect-pollinated.

Standard species: H. sabulosa L. f. Suppl. 280. 1781. In view of the confusion existing as to the exact identity of $H$. bonae-spei and the apparent impossibility of settling it absolutely, H. sabulosa is designated as the standard species of the genus.

## KEY TO THE SPECIES

A. Corolla with sacs or spurs much shorter than the lower lip of the corolla.
a. Plants glabrous or nearly so; leaves lobed or pinnatifid; pouches shallow ..............................................................1. H. sabulosa
aa. Plants pubescent to villous; leaves shallowly or deeply toothed, rarely entire; pouches well developed...............................2. H. montana
AA. Corolla with spurs as long as or longer than the lower lip of the corolla.
b. Corolla $0.8-1.5 \mathrm{~cm}$. long, spurs nearly parallel, often incurved; style not conspicuouly winged..........................................3. H. centrodes
bb. Corolla $0.4-0.6 \mathrm{~cm}$. long, spurs straight, strongly divergent; style conspicuously winged..............................................4. H. gracilis

1. H. sabulosa L. f. Suppl. 280. 1781; Thunb. Nov. Gen. Pl. 79. 1784; Prodr. 105. 1800; Fl. Cap. [ed. Schult.] 485. 1823; Murray, Syst. Veg. ed. 14, 561. 1784, and ed. 15, 598. 1797; Lam. Cycl. 3: 104. 1789 ; Ill. t. 532, fig. 2. 1823; Willd. Sp. Pl. 3: 282. 1800; Martyn in Mill. Dict. ed. 9. 1: 142. 1807; Smith in Rees' Cycl. 17: 4H. 1819; Benth. in Hook. Comp. Bot. Mag. 2: 16. 1836; DC. Prodr. 10: 256. 1846; Hiern in Th.-Dyer, Fl. Cap. $4^{2}$ : 166. 1904.

Paederota bonae-spei L. Sp. Pl. ed. 2, 20. 1762, in part; Amoen. Acad. ed. 1, 6: 84. 1763, in part, and ed. 2. 1764, in part, not Burm. f.; Hout. Handl. ed. 2, 7: 107. 1777, in part; Murray, Syst. Veg. 61. 1797, in part; Richter, Codex, 29. 1840, in part.
[Veronica Africana floribus ad genicula pediculis biuncialibus insidentibus. Burm. Cat. Pl. Afr. 23. 1737.]
[Alsines seu Spergulae dictae species africana. Burm. Cat. Pl. Afr. 23. 1737.]
Annuals; stems quadrangular, simple or branched, erect or prostrate, glabrous or nearly so, $5-50 \mathrm{~cm}$. high, frequently tinged with red; leaves opposite, thin, 1-4 cm. long, $0.2-1.0 \mathrm{~cm}$. wide, ovate or oblong, some-


Fig. 1. Hemimeris sabulosa L. f., plant $\times 1$. yellow with white hairs without, glabrous within, $1.0-1.5 \mathrm{~cm}$. long, upper lobes erect, emarginate, $3-4 \mathrm{~mm}$. long, with a more or less circular depression below the center and generally with two patches of brown spots on either side of this, lateral lobes about 3 mm . long and 2 mm . wide, with groups of sessile glands near the center and an elongated shallow sac toward the base, lower lobe broadly rounded or oblong,
$6-8 \mathrm{~mm}$. long and about as wide, throat very short; stamens erect, filaments glabrous, more or less winged, anthers coherent, not hidden by the upper lip; style longer than the stamens, bent toward the lower lip; capsule glabrous, globose or ovate, $4-5 \mathrm{~mm}$. long, much longer than the calyx; seeds oval, brown, papillate.

Distribution: common in sandy soil from the Cape to Namaqualand and east to Riversdale, flowering from July to November.

[^5]Undoubtedly Linnaeus had this species in mind when he described Hemimeris bonae-spei, as stated before. However, since he confused several things in his original description and since the specimen of Hermann upon which he based the genus cannot be found, it seems advisable to retain the wellestablished name Hemimeris sabulosa and so avoid possible confusion.

The specimen of Bergius collected in 1816 from "Cape Bonae Spei" differs from most of the other collections in having
leaves intermediate between $H$. sabulosa and H. montana. The glabrous character of the plant and the flowers are like those in typical specimens of H. sabulosa. Schlechter 1266, as seen in several herbaria, has similar leaves, some of which are trilobed. The specimens of Pappe at the Albany Museum resemble those collected by Schlechter.
2. H. montana L. f. Suppl. 280. 1781; Thunb. Nov. Gen. Pl. 75. 1784; Prodr. 105 1800; Fl. Cap. [ed. Schult.] 484. 1823; Murray, Syst. Veg. 561. 1784; Willd. Sp. Pl. 3: 282. 1800; Martyn in Miller, Dict. ed. 9, 1: 142. 1807; Smith in Rees' Cycl. 17: 4H. 1819; Benth. in Hook. Comp. Bot. Mag. 2: 16. 1836; DC. Prodr. 10: 255. 1846; Hiern in Th.-Dyer, Fl. Cap. 4²: 165. 1904; Levyns, Fl. Cape Pen. 224, fig. 167. 1929.

Hemimeris alsinoides Lam. Cycl. 3: 105. 1789; Ill. t. 532. fig. 1a-b. 1823.
Hemimeris sinuata Smith in Rees' Cycl. 17: 4H. 1819.
Hemimeris sessilifolia Benth. in Hook. Comp. Bot. Mag. 2: 16. 1836, excluding Burchell's specimen ; DC. Prodr. 10: 255. 1846.
Diascia montana (L. f.) Spreng. Syst. Veg. 2: 800. 1825.
Hemimeris montana L. f. var. $\beta$ latipes Benth. in DC. Prodr. 10: 256. 1846.
Hemimeris latipes Backhouse ex Hiern, in Th.-Dyer, Fl. Cap. $4^{2}$ : 165. 1904.
Diascia Scullyi Hiern in Th.-Dyer, Fl. Cap. 4: 144. 1904.
? Paederota racemosa Houtt. Handl. ed. 2, 7: 110, t. 38, fig.1. 1777.
[Anagallis purpurea bursa pastoris foliis minoribus Petiv. Mus. 36. no. 345. 1695 ; Roy. Ludg. 416. 1740.]
[Anagallis capensis Chamaedryos folio, caule piloso Ray, Hist. Pl. 3, app. 241. 1704.]
[Alsine chamaedrios foliis bijugis Spergula floribus Pluk. Phyt.t. 331, fig. 3. 1691; Mant. 9, t. 331, fig. 3. 1700.]
Stems 8-35 cm. long, quadrangular, often channelled, simple, or more commonly branched, erect or ascending, occasionally weak and more or less scrambling, usually glandular and vis-cid-villous with conspicuous white hairs, sometimes nearly
glabrous; leaves broadly or narrowly ovate, occasionally lanceolate or elliptical, obtuse or less often acute, commonly serrate with blunt teeth, at times nearly entire, $1-5 \mathrm{~cm}$. long, $0.5-$ 2.5 cm . wide, generally much shorter than the internodes, dark green above, sometimes tinged with red or reddish-purple, pubescent or villous, frequently with a group of long white hairs near the base, petioles slender, more or less winged, shorter or nearly as long as the blade, rarely longer, uppermost leaves with shorter petioles, occasionally subsessile; flowers mostly in terminal umbellate clusters consisting of 4-12 or more flowers subtended by leaf-like bracts, or sometimes axillary or solitary on short slender branches; pedicels generally filiform and more or less ribbed, infrequently flattened and more or less winged, $1-5 \mathrm{~cm}$. long, glabrous to densely glandular-pubescent, ascending or nearly erect, sometimes de-


Fig. 2. Hemimeris montana L. f., flower $\times 6$. flexed when mature; buds conspicuous because of the white viscid-villous hairs on the outside of the corolla; calyx-lobes unequal, the uppermost one obovate, obtuse, the others narrower, elliptical or oblong, acute or obtuse, $1.5-2.5 \mathrm{~mm}$. long, white viscid-villous to nearly glabrous; corolla bilabiate, yellow, viscid-villous without, upper lip strongly arched, $2-5 \mathrm{~mm}$. long, emarginate, often with a somewhat circular group of brown spots on either side, lateral lobes larger, rounded, almost as long as broad, spreading, glandular-punctate toward the base and each with a rounded or oval sac at or below the center, this about 1 mm . long and about as deep, sometimes partly closed by two ascend-
ing appendages, lowermost lobe broadly oblong, concave, 4 8 mm . long, $3-7 \mathrm{~mm}$. broad, glandular-punctate near the base, truncate or rounded, usually emarginate; stamens included, anthers generally hidden within the arched upper lip, filaments glandular-pubescent, erect, anthers large, connivent; style longer than the stamens, inclined toward the lower lip, apex stigmatose; capsule glabrous or puberulent, broadly ovate or subglobose, as long as or slightly longer than the calyx, dehiscent nearly to the base along the outer suture and frequently part way from the top along the inner suture, splitting the style base into 4 strands; seeds oval, minute.

Distribution : abundant in sandy areas from the Cape to Namaqualand and east along the coastal region to Port Elizabeth District. Growing under bushes, in the open veld, in cultivated land or in the shade of rocks, frequently where it is moist. Flowering from July to November.

[^6]Cape of Good Hope, year lacking, Harvey (K, type of H. montana $\beta$ latipes Benth.) ; in grassy fields and shady places near the Cape, Aug.-Sept., year lacking, Pappe (K) ; waterfall on Devil's Peak, July, 1883, Wilms 3497 (B, Gen, P) ; Cape of Good Hope, 1831, Verreaux (Gen); Cape of Good Hope, date lacking Ecklon \& Zeyher (Gen) ; throughout Cape District, Aug., 1838, Krauss 1634 (MBG); Cape, Drege (Gen) ; Table Mt., near Camps Bay, Aug., 1900, Diels 17 (B) ; Camps Bay, Sept., 1884, Marloth 461 (M) ; near Cape Town, Sept., year lacking, Lehmann (G) ; sand dunes near Cape Town, 5 Aug., 1846, Prior (K) ; Roggeveld Mts., 6 Aug., 1811, Burchell 1307 (K) ; in sandy places, Tulbagh Kloof, Sept., 1888, Tyson 2296 (M) ; Nieuwkloof near Tulbagh, Oct., 1886, MacOwan 821, in part (K, Gen); Hex River Pass, 13 Oct., 1928, Grant 3804 (P) ; near Robertson, 30 Sept., 1929, de Wet 4938 (NH, P) ; Riversdale, date lacking, Rust 114, 226 (B); mouth of Knysna River, Oct., 1921, Fourcade 1491 (FH) ; Humewood, Sept., 1911, Paterson 17 (A) ; Port Elizabeth, Sept., 1908, Drege 268 (A) ; Port Elizabeth Valley, Aug., 1912, Paterson 2315 (A).

An exceedingly variable species as to the size of the flowers, the amount of pubescence, the size and shape of the leaves, the length of the pedicels, and the size and shape of the corollasacs. The upper petioles are occasionally very short or the leaves may be subsessile as in Ecklon's collection, the type of H. sessilifolia. But even on the type sheet of this species only the pair of leaf-like bracts is sessile. The size of the leaves varies greatly, apparently in direct relation to the amount of water and shade available. In moist shaded places, the plants are usually much larger in every way and generally more villous. This is well shown in Grant 4843, collected in Namaqualand. Typically the leaves are serrate or dentate, but on some specimens they are almost entire and on others, coarsely crenate.

2a. var. pachyceras (Diels) Grant, comb. nov.
Hemimeris pachyceras Diels in Engler's Bot. Jahrb. 44: 121. 1909.

Corolla sacs broader and longer than in the species, varying from $1.5-2.0 \mathrm{~mm}$. long and nearly as broad.

Distribution: in sandy areas or rocky places from Malmesbury District to Namaqualand and east to Mossel Bay.
cape province: Moorreesburg, Nov., 1884, Bachmann 722 (B); Olifant River Mts., 30 Aug., 1894, Schlechter 5088 (K, B, Gen, A) ; Karree Berg, 23 July, 1896, Schlechter 8289 (K, B, US, F, Gen, P, MBG) ; Namaqualand, without definite locality or date, Scully 8 (K) ; southeastern slopes of Roepmyniet, 15 Sept., 1900, Diels 1168 (B, TYPE of $H$. pachyceras) ; Calvinia, Sept., 1900, Pritzel (B); in hills,

Oorloogskloof, Onder Bokkeveld, 21 Aug., 1897, Schlechter 10944, in part (B, K, A, Gen, US, MBG) ; Vogelfontein, 14 Aug., 1896, Schlechter 8517 (A, Gen, P, US, MBG, K, B) ; Gnagas Pass between Middlepost and Ceres, 28 Sept., 1929, Grant 4916 (BH, P, MBG) ; foothills of Verlaten Kloof, Oct., 1920, Marloth 9622 (M); among cliffs on Sneuwkraus, Farm Uitkyk, date lacking, Marloth 9729 (M); in sandy places in Nieuwkloof near Tulbagh, Oct., 1886, MacOwan 821, in part (B, A, G) ; Barrydale, Oct., 1897, Galpin 4356 (A, K); mountain ridges along lower part of Zonder Einde River, date lacking Zeyher 3477 (K, B) ; Mossel Bay District, Klein Berg, 25 Sept., 1897, Galpin 4355 (K).

There is every gradation possible between this and the species, which makes specific separation impossible. The most nearly consistent difference is the size of the corolla-sacs, and even this varies as may be seen in MacOwan 821 and 1768, Marloth 12942, Andreae 428, Schlechter 8517 and 10944, Rust 226, and Grant 4869a. In the last, corollas may be found in which the sac is broad and shallow or almost spurred. The nearly entire leaves of the plant on the type sheet are duplicated in many specimens, having the short sacs typical of the species. The ovary is papillose in some specimens and not in others in both the species and the variety.
3. H. centrodes Hiern in Th.-Dyer, Fl. Cap. 4²: 167. 1904.

Hemimeris nana Diels in Engler's Bot. Jahrb. 44: 121. 1909.

A glandular and viscid-pubescent annual, $10-30 \mathrm{~cm}$. high, simple or more commonly branched from at or near the base, stems quadrangular, relatively stout; leaves opposite, ovate or elliptical, obtuse, coarsely and bluntly toothed, sometimes pinnatifid, rarely shallowly dentate, $2-4 \mathrm{~cm}$. long, $0.5-1.0 \mathrm{~cm}$. wide, base cuneate, petioles as long as or shorter than the blade, the uppermost leaves occasionally subsessile, internodes usually longer than the leaves, sometimes with smaller leaves fascicled in the axils; inflorescence racemose, often with several flowers having much shortened internodes clustered at the apex, and axillary flowers lower on the stem; pedicels rather stout, 1.54.0 cm . long, frequently deflexed in maturity, bracts linear or oblong, irregularly dentate with scattered teeth; calyx-lobes unequal, ciliate, ovate, oblong, or elliptical, obtuse, 4-6 mm. long, the uppermost lobe larger than the others and rounded
at the apex ; corolla yellow, pubescent without, $0.8-1.5 \mathrm{~cm}$. long, the upper lip 2.0-2.5 mm. long, erect, emarginate, with an incurved margin and 2 dark brown spots on either side of the center, lateral lobes rounded, about 2 mm . long and wide, densely maculate with sessile glands near the base and with ascending pockets projecting over the spur, middle lobe broadly rounded, 4-6 mm. long, $5-7 \mathrm{~mm}$. broad, spurs 2 , broadly obconical, nearly parallel for most of their length, incurved, blunt at the apex, $5-7 \mathrm{~mm}$. long, $2-3 \mathrm{~mm}$. broad at the base; stamens erect, shorter than the upper lip, filaments with broad membranaceous wings, anthers large, subglobose or oval, about 1.5 mm . long; ovary minutely puberulent, style narrowly winged, stout, curved toward the lower lip and shorter than the ovary; capsule subglobose, $5-7 \mathrm{~mm}$. long, exserted; seeds numerous, black, minutely papillose, sometimes with very narrow white wings.

Distribution: in sandstone regions in the mountains around Calvinia and south into the Sutherland and Laingsburg Districts.
cape province: in Karroo soil, Calvinia, Sept., year lacking, Leipoldt 936 (K); stony ground near Elandsfontein Farm on road between Calvinia and Middlepost, 28 Sept., 1929, Grant \& Theiler 4891 (K); Hantam Mts. west of Calvinia, 14 Sept., 1900, Diels 643 (B, type of H. nana) ; near Calvinia, 28 Sept., 1929, Grant \& Theiler 4889 (BH, K, P, MBG) ; Bokkeveld, 12-13 Sept., 1900, Pritzel (B); Onder Bokkeveld, in hills around Matjesfontein, 20 Aug., 1897, Schlechter 10925 (K, TYPe, B, Gen, US, MBG).

This is the largest and showiest of the four species in the genus. At first sight, one might easily take it for a yellowflowered Diascia, but the shape of the corolla and the number of stamens place it in Hemimeris. The brown spots on the corolla often are conspicuous.
4. H. gracilis Schlechter in Jour. Bot. 36: 375. 1898; Hiern in Th.-Dyer, Fl. Cap. $4^{2}$ : 167. 1904.

Small slender, glandular-pubescent annuals, erect, simple or occasionally with weak branches from near the base, $6-20 \mathrm{~cm}$. high, stems tetragonal, often conspicuously channelled, internodes usually longer than the leaves; leaves thin, ovate to oblong, broadly obtuse, dentate with a few shallow and blunt
teeth, or coarsely dentate with crenate teeth, sometimes practically entire, truncate, cuneate or cordate at base, 0.8-5.5 cm. long, $0.4-2.5 \mathrm{~cm}$. wide, petioles slender, shorter or longer than the blade; flowers axillary in the uppermost leaves, often crowded toward the apex, the internodes being very much shortened; pedicels slender, frequently deflexed in fruit, 1.54.0 cm . long ; calyx-lobes narrowly oblong to lanceolate, obtuse, unequal, $2-4 \mathrm{~mm}$. long, the uppermost longer and broader than the others; corolla yellow, $4-6 \mathrm{~mm}$.


Fig. 3. Hemimeris gracilis Schlechter, calyx and pistil $\times 15$. long, posterior lip short, concave, the upper part arched and more or less concealing the anthers, anterior lip longer, the lobes broadly rounded or truncate, the lateral lobes short, spurs $3-5 \mathrm{~mm}$. long, widely divergent, conical, blunt, longer than the lower lip, throat short, gibbous; stamens erect, filaments winged, glabrous; style about as long as the ovary, $1-2 \mathrm{~mm}$. long, glabrous, broadly winged, the wings wider than the style proper, stigma capitate, capsule subglobose, $3-4 \mathrm{~mm}$. long, sparsely glandular-pubescent or glabrous; seeds numerous, papillate, oval, brown.

Distribution : in sandy or rocky places from Van Rhynsdorp and Calvinia east to the Laingsburg District. Flowering from July until October or November.

Cape province: western slopes of Bokkeveld Mts., Oct., 1916, Marloth 7662 (M); Oorlogskloof, Onder Bokkeveld, 21 Aug., 1897, Schlechter 10971 (B, K, Gen, A, US, MBG); summit, Kubiskouw, on shaded krantzes under rocks, 8 Sept., 1926, Marloth 12878 (M); in hills, Matjesfontein, Onder Bokkeveld, 19 Aug., 1897, Sohlechter 10918 (B, K, Gen, A, US) ; Hex River Valley, 14 Aug., 1896, Wolley Dod 4010 (K) ; Hex River Valley, roadside 3 miles up from station, 14 Aug., 1897, Wolley Dod (B, Type).

DOUBTFUL SPECIES
Hemimeris bonae-spei L. Pl. Rar. Afr. 8. 1760. Anagallis capensis L. Sp. Pl. ed. 1, 149. 1753, and ed. 10, 920. 1759.

Hemimeris acutifolia Pers. Syn. Pl. 2: 162. 1807. = Alonsoa acutifolia R. \& P. Syst. Veg. 153. 1798.
Hemimeris caulialata Pers. Syn. Pl. 2: 162. 1807. = Alonsoa linearis R. \& P. Syst. Veg. 154. 1798.
Hemimeris coccinea Willd. Sp. Pl. 3: 283. 1800. = Alonsoa linearis R. \& P. Syst. Veg. 154. 1798.
Hemimeris diffusa L. f. Suppl. 280. 1781. = Diascia diffusa (L. f.) Benth. in Hook. Comp. Bot. Mag. 2: 16. 1836, and Diascia elongata Benth. in Hook. l.c. 1836.
Hemimeris elegans Hiern in Jour. Bot. 39: 102. 1901. = Diascia sp.
Hemimeris hirsuta Spreng. Syst. Veg. 2: 809. 1825. = Alonsoa sp.
Hemimeris incisifolia Pers. Syn. Pl. 2: 162. 1807. = Alonsoa incisifolia R. \& P. Syst. Veg. 154. 1798.
Hemimeris intermedia Lodd. Bot. Cab. t. 1456. 1828. = Alonsoa incisifolia R. \& P. Syst. Veg. 154. 1798.
Hemimeris linearifolia HBK. Nov. Gen. 2: 377. 1817. = Alonsoa linearifolia Steud. Nom. ed. 2. 1: 60. 1841.
Hemimeris macrophylla Thun. Nov. Gen. Pl. 76. 1784. = Diascia macrophylla (Thun.) Spreng. Syst. Veg. 2: 800. 1825.
Hemimeris Mutisii HBK. Nov. Gen. 2: 376. 1817. = Alonsoa Mutisii G. Don, Gen. Hist. 4: 513. 1838.
Hemimeris parviflora HBK. Nov. Gen. 2: 376. 1817. = Alonsoa caulialata R. \& P. Syst. Veg. 152. 1798.
Hemimeris peduncularis Lam. Cycl. 3: 105. 1789. = Diascia diffusa (L. f.) Benth. in Hook. Comp. Bot. Mag. 2: 16. 1836.
Hemimeris procumbens Pers. Syn. Pl. 2: 162. 1807. = Alonsoa procumbens R. \& P. Syst. Veg. 154. 1798.
Hemimeris unilabiata (L. f.) Thun. Nov. Gen. Pl. 78. 1784. = Diascia unilabiata (L. f.) Benth. in DC. Prodr. 10: 257. 1846.
Hemimeris urticifolia Willd. Sp. Pl. 3: 282. 1800 = Alonsoa incisifolia R. \& P. Syst. Veg. 154. 1798.


[^0]:    ${ }^{1}$ L. Pl. Rar. Afr. 8. 1760.
    ${ }^{2}$ J. J. Smith in Rees' Cycl. 17: 44. 1819.
    ${ }^{3}$ Hiern in Jour. Bot. 39: 103. 1901.

[^1]:    ${ }^{4}$ Th.-Dyer in Fl. Cap. 4²: 139. 1904.
    ${ }^{5}$ Benth. in Hook. Comp. Bot. Mag. 2: 13. 1836.
    ${ }^{6}$ Linn. 1.c.
    ${ }^{7}$ Britten in Jour. Bot. 47: 45. 1909.
    ${ }^{8}$ Linn. Sp. Pl. ed. 2, 20. 1762; Amoen. Acad. ed. 1, 6: 83. 1763, and ed. 2, 1764.
    ${ }^{9}$ Hiern, l.c.

[^2]:    ${ }^{10}$ Linn. f. Suppl. 45 and 280. 1781.
    ${ }^{11}$ Lamarck, Cycl. 3: 104. 1789.
    ${ }^{12}$ Richter, Codex. 29. 1840.

[^3]:    ${ }^{13}$ Thunberg, Nov. Gen. Pl. 74. 1784.
    ${ }^{14}$ Jussieu, Gen. Pl. 120. 1789.
    ${ }^{15}$ Willdenow, Sp. Pl. 3: 282. 1800.

[^4]:    ${ }^{16}$ J. J. Smith in Rees' Cycl. 17: 44. 1819.
    ${ }^{17}$ Link \& Otto, Ic. Pl. Sel. 7, t.2. 1820.
    ${ }^{18}$ Sprengel, Syst. Veg. ed. 16, 2: 800. 1825.
    ${ }^{10}$ Benth. in Hook. Comp. Bot. Mag. 2: 13. 1836.

[^5]:    cape province: without definite locality or date, Forbes (K, B) ; Harvey (K); Menzies (K) ; Thunberg 185 (L, TYPE) ; ex Link Herb. (B) ; Mund \& Maire (B); Burmann (Gen) ; Sieber 381 (Gen, MBG) ; Doorn River, Sept., 1900, Pritzel (B); Alexander's Hoek, 2 Sept., 1894, Schlechter 5137 (A, B) ; Zeekoe Vlei, 12 Aug., 1896, Schlechter 8482 (K, B, Gen, A, US, P, MBG); Olifant's River and near Brakfontein, 1836, Zeyher 1268 (K, B) ; Clanwilliam, Aug., year lacking, Ecklon \&f Zeyher (A); Clanwilliam, Zeyher (K); Veld Drift, 29 Sept. 1927, Grant 3461 (Gen, K, P, MBG) ; near Hopefield, Sept., 1885, Bachmann 1168 (B) ; same locality, Aug., 1886, Bachmann 1167 (B) ; Sept., 1883, Bachmann 75, 1169 (B); near Hopefield, 11 Aug., 1929, Grant 4639 (K, Gen) ; sandy areas between Darling and Yserfontein, 18 Aug., 1929, Grant \&f Theiler 4652 (K, B, Gen, BH, P, MBG) ; Zwaartwater Farm, near Darling, 30 Sept., 1926, Grant 2525 (BH, K, P, MBG) ; Yserfontein, 30 Sept., 1926, Grant 2582 (BH, B, P, MBG); along roadside between Darling and Yserfontein, 30 Sept., 1926, Grant 2551a (BH, K, P, MBG) ; Paarl, date lacking, Drege (A) ; Hottentot's Holland, date lacking, Sprengel's Herb. 381 (B) ; near Zoutrivier, 15 Sept., 1816, Bergius (B) ; strand by Green Point, 19 Sept., 1883, Wilms 3499 (B) ; Kalk Bay, Oct., year lacking, Pappe (A); Simon's Bay, 1853-56, Wright (G, US) ; Cape, 21 Aug., 1816, Bergius (B); sand flats between Blaauberg and Tygerberg, date lacking, Drege 3151d (K, MBG) ; mountains near
    : Cape Town, date lacking, Ecklon (K, B); sand dunes, Cape Town, date lacking, Prior (K, G) ; Camp Ground near Cape Town, 15 Aug., 1895, W olley Dod 163 (K); Zeekoe Vlei near Cape Town, 28 Sept., 1929, Starke (MBG, P) ; near Muizenberg, 31 July, 1892, Schlechter 1266 (K, B, A, Gen) ; Elands Kop in the Duinen, Riversdale District, Sept., 1914, Muir 1764 (A).

[^6]:    cape province: without definite locality or date, Garcin in Burmann Herb, (Gen) ; Thunberg, in Linnaean Herb. (L Type) ; Sparrmann 6 in Linnaean Herb. (L) ; Oldenland in Herb. Sloane (BM) ; Prior (K) ; Jan. 1880, Rogers 13 (K); Reeves (K) ; Harvey (K) ; Pappe (K) ; Sieber 144 (K, B, Gen) ; Forbes (K); Burmann Herb. (Gen) ; Zeyher (B, A) ; Bergius (B) ; Mund \& Maire (B) ; Ascherson (B) ; Khamiesberg, under rocks, Beaem Hill, 15 Sept., 1911, Pearson 6685 (K); Khamiesberg, Aug.-Sept., year lacking, Bolus 9436 (BH, P, MBG); Namaroup, Sept., 1911, Pearson 6600 (K) ; under rocks, Kharkams, Sept., 1911, Pearson 6715 (K) ; Giftberg, Sept., 1911, Phillips 7353 (K) ; Steinkop, Aug., 1925, Marloth 6770 (M); Klipfontein, 8 Sept., 1925, Marloth 12676 (M); Namaqualand Minor, Aug.-Sept., 1883, Bolus 9436 (BH, P, MBG); Calvinia, 18 Sept., 1900, Diels 759 (B) ; Nieuwerfontein, 26 Sept., 1929, Grant 4869a (BH, K, NH, P, MBG) ; Van Rhyns Pass, 28 Sept., 1929, Grant 4880 (BH, P, MBG) ; Klaver, 30 July, 1920, Andreae 428 (M) ; Klaver, 13 Sept., 1926, Marloth 12942 (M); Cedarbergen, near Wupperthal, date lacking, Drege 3151b (K); Wupperthal, date lacking, Drege 3151 (K) ; Het Kruis, Sept., 1912, Stephens \& Glover 8789 (K) ; Saldanha Bay, 7 Sept., 1929, Grant 4546 (K, B, BH, P, MBG); Saldanha Bay, Sept., 1827, Verreaux (Gen) ; between Darling and Yserfontein, 18 Aug., 1929, Grant 4658 (BH, P, MBG) ; Darling, Aug., 1883, Bachmann 545 (B) ; Paarde Berg and Zwartland, date lacking, Ecklon (K, TyPe of H. sessilifolia Benth.) ; Wellington, Aug., 1886, Cummings 74 (P, US) ; Stellenbosch, 1865, Sanderson 972 (K); at the foot of Paarl Mt., date lacking, Drege (K, MBG) ; Diep Rivier, Oct., 1827, Verreaux (Gen) ; Simonstown, Aug., 1912, Rogers 11247 (A) ; Simons Bay, 185356, Wright (K, US, MBG) ; above Groot Schuur, 29 July, 1895, W olley Dod 165 (K) ; Table Mt., Aug., year lacking, Ecklon 391 (K, MBG) ; Camp Ground near Cape Town, Aug., 1875, Bolus 2872 (K) ; Lion's Head near Camps Bay, Oct., 1896, MacOwan 1768 (K, B, Gen) ; near Cape Town, date lacking, Harvey 414 (K);

